



A Proposal for Advancing Indian Standard Time

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Sequence of Presentation

1. History of Adjustments to Local Sun Times
2. Arguments Against DST in India
3. Our Proposal
4. Potential Benefits
5. Possible Disadvantages





Three Adjustments to Natural (Local) Sun-Time



1. Mean Solar Time (based on average length of day during an year); introduced first in Geneva in 1780;



2. Standard Time, introduced first in England in 1840 as railroad time; this led to standard time zones, and



3. Daylight Saving Time, adopted first in Europe in 1916.



Arguments Against Time Zones and DST in India



Against Time Zones	Against DST
Will increase “fissiparous” tendencies	--
Will increase risk of accidents	Accident risk increases with bi-annual changes
Savings estimated to be modest	Savings modest for 1 hr. advancement (TERI)

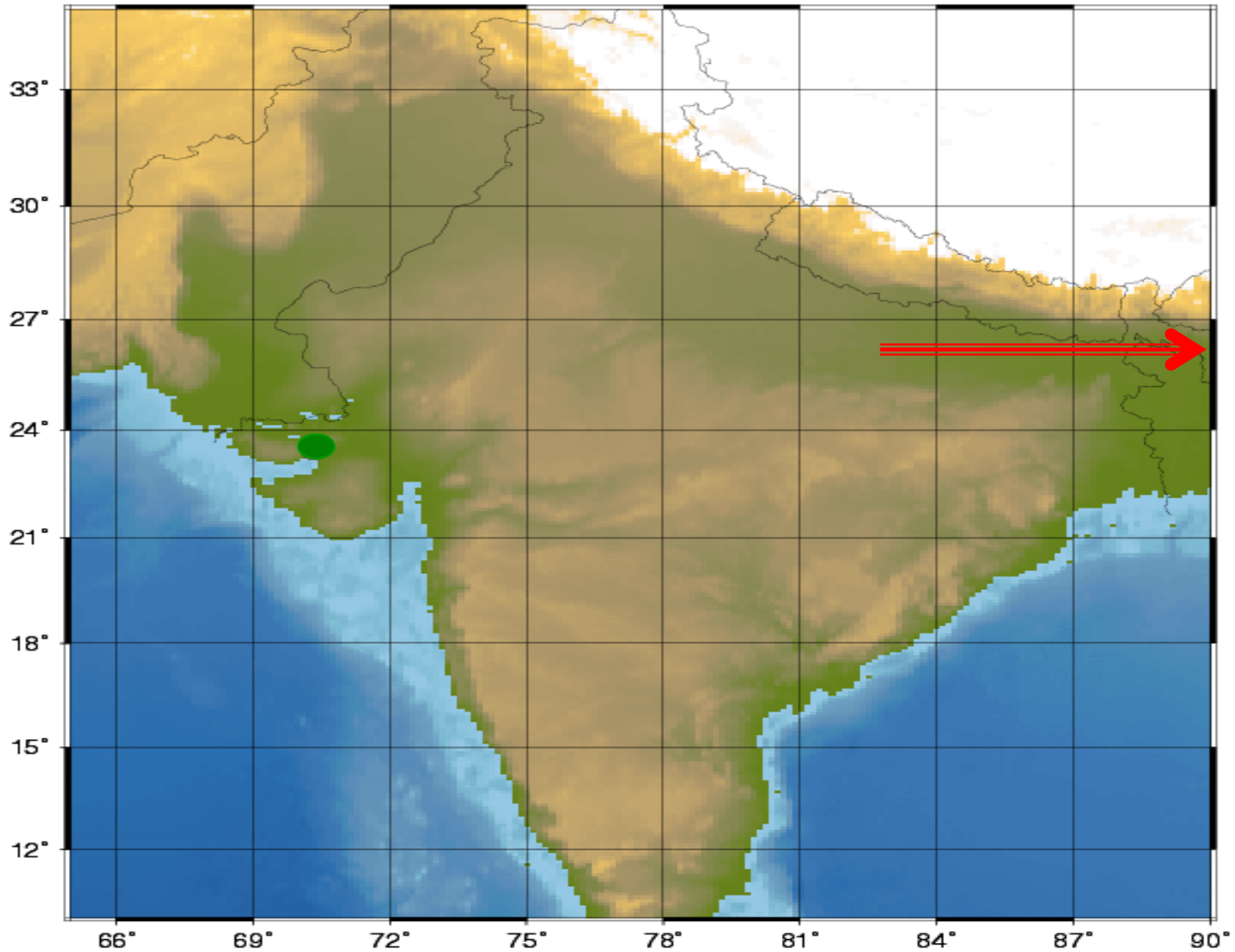


Our Proposal

- ★ To shift IST from 82.5°E (Jarwa, UP) to 90°E (Dhuburi, Assam), i.e., from being 5 hours 30 minutes ahead of UTC (=GMT) to being 6 hours ahead of UTC;
- ★ Will provide an extra half hour of daylight in the evenings, when it is more useful, all year long for the entire country.



Shift – Indian Standard Time From 82.5° E to 90° E





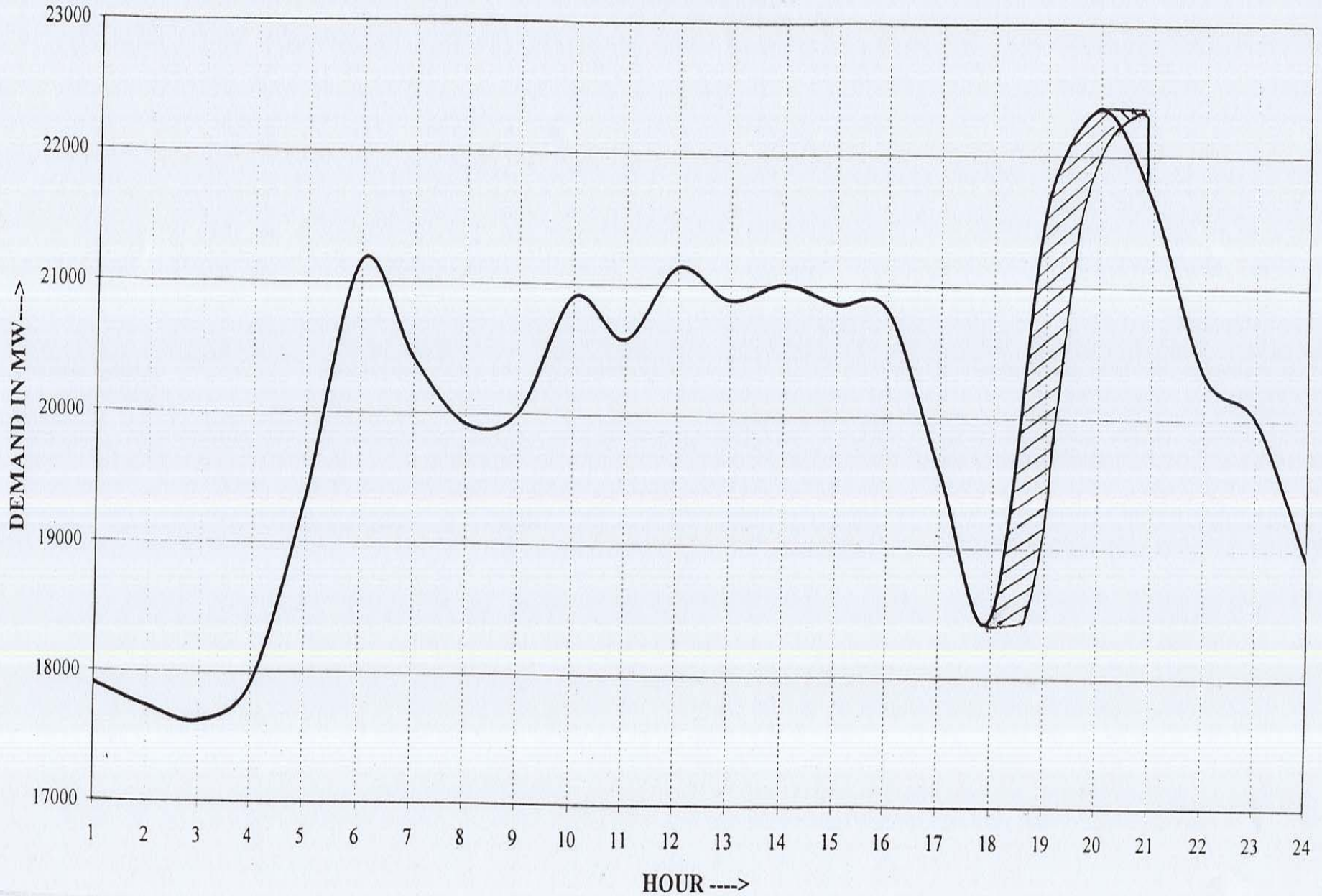
Four benefits of time shift, each modest but significant



1. Saves electricity (most evidence).
2. Reduces traffic fatalities and injuries, some data;
3. Reduces street crime, some evidence;
4. May increase productivity (?)—our expectation.



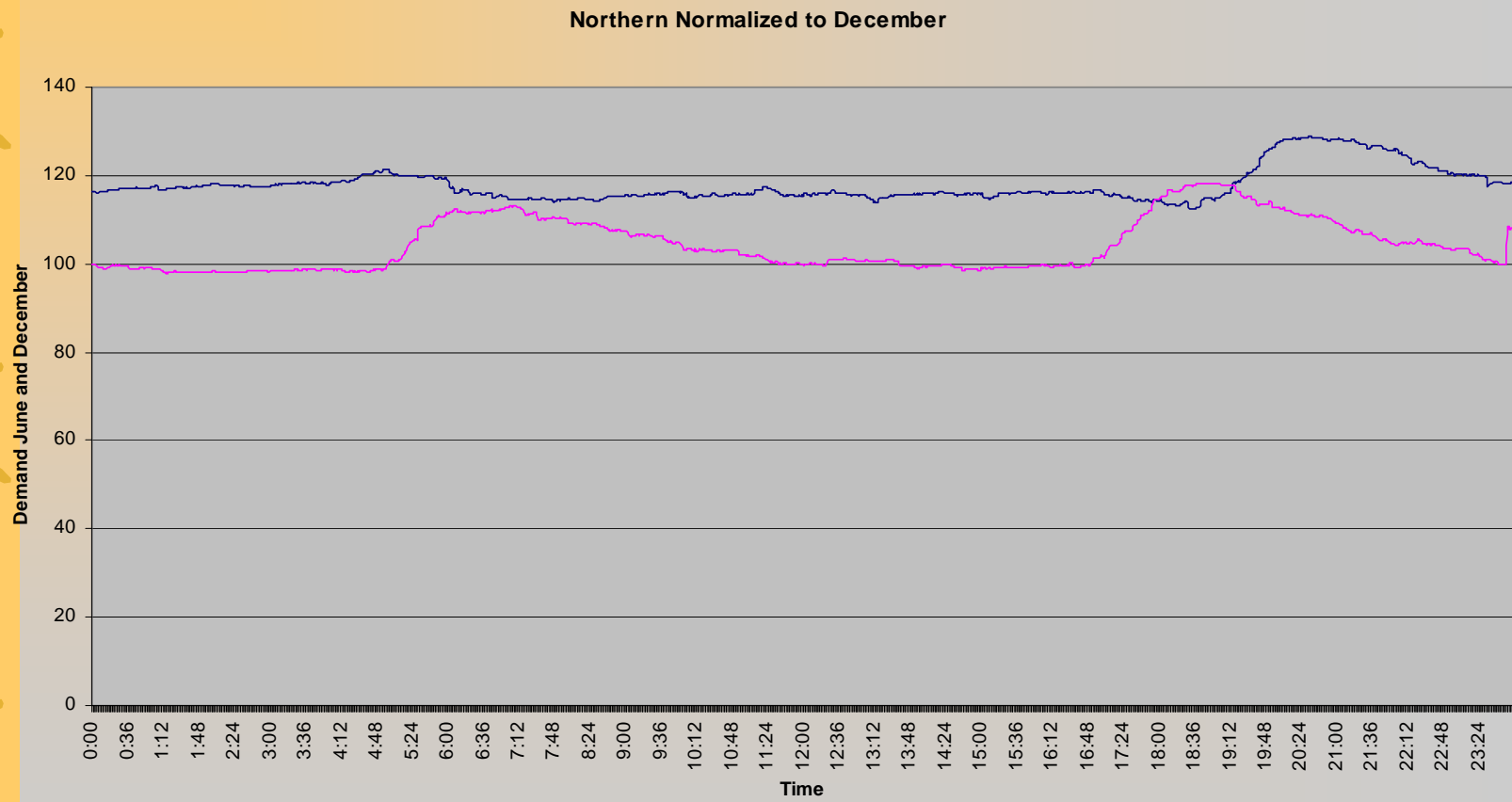
LOAD CURVE FOR MAXIMUM DEMAND DAY 2004-05 (28-MAR-2005)





Normalized Load Curves

Northern Grid; June & December

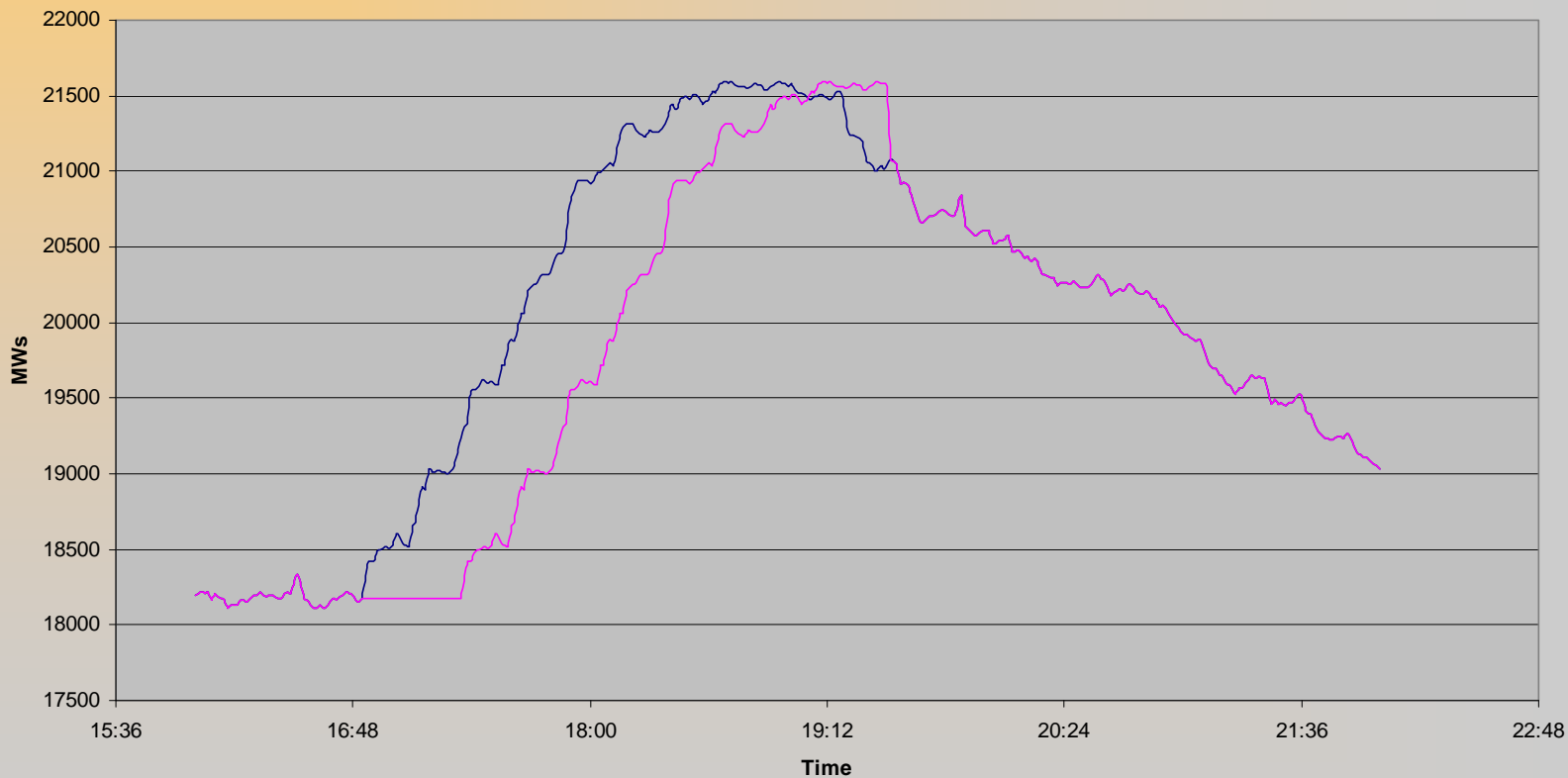




Typical Estimation--Northern Region, 1 December 2005



Northern Region 1 December 2005





Summary of Electricity Savings (million kWh)



Date	01-06-05	01-09-05	01-12-05	01-03-06
Northern	1.45	1.03	1.60	1.55
Southern	1.42	1.43	1.50	1.65
Eastern	0.93	1.16	0.98	0.86
Western	(--)	(--)	0.81	1.10
Total	4.85	4.57	4.89	4.16



Estimate of Annual Savings

1. Annually 1.7 billion units, @ Rs. 5 per unit, the estimate of electricity savings is ~Rs. 850 crores per year;
2. Expected to go up in subsequent years because consumption is increasing and share of domestic and commercial sectors increases with economic development.





Decreases in Electricity Use during first weeks of DST



Examples of Regions following 1 hour shift	Reduction in electricity consumption
Los Angeles	~ 1%
Bonneville (NW)	< 1%
Dallas	~ 0.5%
Chicago	< 0.1%
New Zealand	~3.5%



Decrease in Fatal Motor Vehicle Accidents



1. More fatal accidents occur in the evening;
2. 0.7% (net) decrease in fatal motor vehicle accidents in US in March & April under DST, close to 1% net decrease in the UK;
3. Road Accident Fatalities Rates in India are 10 times (by number of vehicles; twice on the basis of population) those in richer economies; 85,000 deaths and 1.2 million injuries annually;
4. Very little information on accident rates by time of day in India.



Reduction in Crime

1. Violent crime reduced 10-13% during DST in Washington, DC (March & April);
2. Indian statistics on crime by time of day difficult to find; anecdotal evidence of purse and chain snatchings during dusk. More people will be able to get home before dark.





Other Benefits

1. “Mainstreaming” the Northeast;
2. Fewer sports events called off because of poor lighting conditions;
3. Half hour difference is odd (used by only 5% of regions--e.g, Newfoundland, Iran, Afghanistan Myanmar, New South Wales);
4. Possible increase in outdoor activities and shopping.
--Except the first, remaining are weak arguments for adoption.





Possible Disadvantages of the Proposed Change in IST



<u>Possible Disadvantages</u>	<u>Possible Rebuttals</u>
Later winter sunrises—children having to get up in the dark and go to school in cold weather;	Many schools have winter timings; latest sunrise in Delhi is at 0745, civil twilight 26 min. earlier.
Less overlap with California time (when 0800 PST, it is 2030 or 2130 IST, it will become 2100 or 2200 IST);	More overlap with Eastern countries;
May affect religious observances linked to the sun or moon	Half an hour shift is not that big.



Thank You

